



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2851-2, Jack Vanderwey**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 2851-2, Jack Vanderwey, 29962 270th Avenue, Valentine NE 69201.

The Chief Engineer is recommending APPROVAL of Application No. 2851-2 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. The wells approved under Water Permit No. 2851-2 are located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals shall be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The wells authorized by Permit No. 2851-2 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

See report on application for additional information.

Eric Gronlund, Chief Engineer
October 11, 2022

Report to the Chief Engineer

On Water Permit Application Nos. 2851-2 and 2852-2

Jack Vanderwey

October 11, 2022

Water Permit Application No. 2851-2 proposes to divert water at a maximum instantaneous rate of 1.78 cubic feet of water per second (cfs) from two wells to be completed into the Ogallala aquifer (approximately 240 feet deep) located in the approximate center of the SW $\frac{1}{4}$ and SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 23 for the irrigation of 135 acres located in the SW $\frac{1}{4}$ of Section 23; all in T36N-R29W. The site of interest is located in Todd County approximately 16 miles south of Mission, SD.

Water Permit Application No. 2852-2 proposes to divert water at a maximum instantaneous rate of 1.78 cfs from two wells to be completed into the Ogallala aquifer (approximately 240 feet deep) located in the approximate center of the NW $\frac{1}{4}$ and NW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 26 for the irrigation of 135 acres located in the NW $\frac{1}{4}$ of Section 26; all in T36N-R29W. The site of interest is located in Todd County approximately 17 miles south of Mission, SD.

AQUIFER: Ogallala (OGLL)

HYDROGEOLOGY:

The Ogallala aquifer is encompassed within the High Plains aquifer (Filipovic, 2004 and 2011). The High Plains aquifer contains geologic units of late Tertiary and Quaternary age that are comprised of the Brule Formation, Arikaree Group, Ogallala Group, as well as other hydrologically connected alluvial, dune-sand, and valley-fill deposits (Gutentag et al., 1984). The Ogallala Group is composed of the Fort Randall, Ash Hollow, and Valentine Formations (Hammond, 1994; Filipovic, 2011; Martin et al., 2004). Within the High Plains aquifer system in South Dakota, the Ogallala aquifer is the uppermost, most readily available aquifer (Filipovic, 2011). The SD DANR-Water Rights Program and Water Management Board have historically considered the High Plains aquifer to be comprised of the Ogallala aquifer and the Arikaree aquifer to manage this regional water resource, and the two aquifers are treated as separate water sources (Water Rights, 2022c).

The Ogallala Group is comprised of gravel, fine to medium sand and sandstone, and poorly consolidated sand, silt, and clay that were deposited from eastward flowing braided streams (Gutentag et al., 1984; Martin et al., 2004). The Ogallala Group has a documented maximum cumulative thickness of approximately 700 feet (Gutentag et al., 1984). The Ogallala aquifer is generally under unconfined conditions but can be overlain by unconsolidated alluvium and eolian deposits (Filipovic, 2004 and 2011; Water Rights, 2022b and 2022d).

No water well or test hole completion reports were submitted with Water Permit Application Nos. 2851-2 or 2852-2. Within approximately one mile of the proposed diversion points, water well completion reports on file for wells completed into the Ogallala aquifer have saturated aquifer thicknesses ranging from approximately 40 to 140 feet, with the depth to the top of

aquifer materials ranging from approximately 60 to 90 feet below the ground surface, and static water levels varying between 60 to 90 feet below the ground surface at the time of well completion (Water Rights, 2022c and 2022d). Based on the water well completion reports on file, and the lithologic logs on file for nearby observation wells, the Ogallala aquifer is expected to be unconfined near the proposed diversion points (SDGS, 2022; Water Rights, 2022b, 2022c and 2022d).

The Ogallala aquifer in South Dakota is split into two portions: the main body west of Ponca Creek, and the remnant body east of Ponca Creek (Filipovic, 2004; Martin et al., 2004). Ponca Creek has completely incised through the Ogallala aquifer along its channel. The proposed diversion points for these applications are within the main body of the Ogallala aquifer (Martin et al., 2004). For the remainder of this report, references to the Ogallala aquifer specifically reference the main body of the Ogallala aquifer west of Ponca Creek in South Dakota.

South Dakota Codified Law (SDCL) 46-2A-9

Pursuant to SDCL 46-2A-9, “A permit to appropriate water may be issued only if there is a reasonable probability that there is unappropriated water available for the applicant’s proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board as defined by SDCL 46-2-9 and 46-2-11.” This report will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic water uses and water rights within the Ogallala aquifer.

WATER AVAILABILITY:

Water Permit Application Nos. 2851-2 and 2852-2 propose to appropriate water from the Ogallala aquifer. The probability of unappropriated water being available from the aquifer can be evaluated by considering SDCL 46-6-3.1, which requires “No application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of water to the groundwater source. An application may be approved, however, for withdrawals of groundwater from any groundwater formation older than or stratigraphically lower than the greenhorn formation in excess of the average estimated annual recharge for use by water distribution systems.” The Ogallala aquifer is not older than or stratigraphically lower than the Greenhorn Formation (Fahrenbach et al., 2010), and the applicant’s proposed use is not for use in a water distribution system as defined by SDCL 46-1-6(17). Therefore, the average annual recharge and average annual withdrawal rates to and from the Ogallala aquifer must be considered.

HYDROLOGIC BUDGET:

The hydrologic budget completed in this analysis will exclude the water rights/permits not completed into the main body of the Ogallala aquifer. It is worth noting the wells authorized by Water Permit Nos. 2833-2 and 2834-2 are expected to be completed into relatively small sand and gravel deposits of Quaternary Eolian and Quaternary Terrace aquifers that have a significant hydrologic connection to the Ogallala aquifer. However, these deposits are geologically distinct from the Ogallala Group, do not directly overlie the Ogallala aquifer, and have subsequently been identified as independent formations from the Ogallala aquifer. Due to the nature of natural discharge from the Ogallala aquifer flowing into and subsequently through these two particular deposits before discharging to the Keya Paha River, the estimated annual use by Water Permit Nos. 2833-2 and 2834-2 will be accounted for as Ogallala aquifer withdrawals. A more detailed discussion is available in Mathiowetz (2022). Additionally, Water Right No. 1260-2, which is labeled as withdrawing from the Arikaree aquifer, will be considered as completed into the Quaternary Eolian aquifer based on current lithologic information that was not available at the time the permit was issued and will also be added to the hydrologic budget of the Ogallala aquifer for the previously discussed reasons (Mathiowetz, 2022).

Recharge

Recharge to the Ogallala aquifer is primarily through the infiltration of precipitation (Filipovic, 2004 and 2011). Kolm and Case (1983) estimated a range of recharge rates for the High Plains aquifer using a two-dimensional, finite-difference model. Hedges and Burch (1985) used both base-flow recession and observation well data analysis to develop their recharge rate estimates to the Ogallala aquifer specifically. Cederberg (2021) cited a combination of sources to estimate the areal extent of the main body of the Ogallala aquifer to be approximately 1,005,360 acres in South Dakota. Table 1 lists the average annual recharge rate in acre-feet per year based on the source of the recharge rate and Cederberg's (2021) estimated areal extent of the main body of the Ogallala aquifer. Therefore, the average annual recharge rate to the Ogallala aquifer within the main body of the Ogallala Group in South Dakota ranges between approximately 108,914 to 284,852 acre-feet per year.

Table 1. Estimated average annual recharge rate to the main body of the Ogallala aquifer (Kolm and Case, 1983; Hedges and Burch 1985; Cederberg, 2021)

Estimated Avg. Annual Recharge Rate (inches/year)	Method	Source	Estimated Avg. Annual Recharge Rate (acre-feet/year)
1.3	Computer Model	Kolm and Case (1983)	108,914
1.8	Computer Model	Kolm and Case (1983)	150,804
1.88	Base-Flow Recession	Hedges and Burch (1985)	157,506
3.4	Observation Well Data	Hedges and Burch (1985)	284,852

Discharge

Discharge from the Ogallala aquifer is primarily through direct evapotranspiration, outflow to streams and rivers, outflow to adjacent and hydrologically connected aquifers, and well withdrawals (Filipovic, 2004 and 2011; Water Rights, 2022c and 2022d).

Currently, there are 176 water rights/permits authorized to withdraw water (including Water Right No. 1260-2) and five future use permits reserving 6,633 acre-feet per year from the entirety of the Ogallala aquifer in South Dakota (Water Rights, 2022c).

Water Right Nos. 475-2 and 1114-2 and Water Permit Nos. 2678-2 and 2679-2 no longer report annual water use because the land authorized for irrigation has been sold to a nearby tribe (Water Rights, 2022c). The status of irrigation water withdrawals from the Ogallala aquifer by these four permits is unknown.

Thus, this discharge analysis addresses only 172 water rights/permits (including Water Right No. 1260-2) (142 irrigation and 30 non-irrigation) plus the five future use permits reserving water from the entirety of the Ogallala aquifer in South Dakota (Water Rights, 2022c). Within the main body of the Ogallala aquifer in South Dakota, of which the aquifers for Water Permit Application Nos. 2833-2 and 2834-2 are hydrologic extensions of, there are 150 water rights/permits (136 irrigation (including Water Right No. 1260-2) and 14 non-irrigation), along with three future use permits (Nos. 551-2, 882-2, and 2849-2 reserving 5,986 acre-feet per year), that are authorized to withdraw or reserve water from the main body of the Ogallala aquifer (Water Rights, 2022c). For the purpose of estimating average annual withdrawals, the future use permits are assumed to be fully developable for a total of 5,986 acre-feet per year (Table 2).

Table 2 summarizes the 14 non-irrigation water rights/permits authorized to appropriate water from the main body of the Ogallala aquifer, plus the three future use permits reserving water from the main body of the Ogallala aquifer, with the estimated annual use for each water right/permit as determined by their limiting diversion rate or annual volume. Historically, average water use by non-irrigation appropriations limited by an instantaneous diversion rate have been assumed to be pumping 60% of full time at the respective permitted diversion rate. Water rights/permits limited by an annual volume are assumed to withdraw their entire respective annual volume limitation. This is a standard method used by the DANR-Water Rights Program for estimating annual withdrawals by non-irrigation appropriations from an aquifer (Water Rights, 2022c). Overall, the estimated average annual withdrawal rate for the non-irrigation water rights/permits, plus the three future use permits, within the main body of the Ogallala aquifer is approximately 12,275 acre-feet per year (Table 2) (Water Rights, 2022c).

Table 2. Estimated annual use for the non-irrigation water rights/permits authorized to divert water from the main body of the Ogallala aquifer, and the future use permits reserving water (Water Rights, 2022c)

Permit No.	Name	County	Status	Use	Authorized Diversion Rate (cfs)	Authorized Annual Volume (acre-feet)	Estimated Use (acre-feet/year)
521-2	City of Winner	Tripp	LC	MUN	4.11		1,785.4
551-2	City of Winner	Tripp	FU	MUN	2.44		1,586
632-2	City of Colombe	Tripp	LC	MUN	0.22		95.6
882-2	City of Winner	Tripp	FU	MUN	n/a		0
976-2	City of Colombe	Tripp	LC	MUN	0.33		143.4
1038-2	City of Winner	Tripp	LC	MUN	0.87		377.9
1285-2	City of Winner	Tripp	LC	MUN	0.67		291
1286-2	City of Winner	Tripp	LC	MUN	0.72		312.8
1416-2	City of Winner	Tripp	LC	MUN	0.69		299.7
1942-2	Littau & Massa Et Al	Tripp	LC	DOM	0.09		39.1
2293-2	Tripp County Water User District	Tripp	LC	RWS	3.88		1685.5
2455-2	Martin J Vanderploeg	Bennett	LC	FWP	0.045		19.5
2505-2	Lakeview Christian Reform Church	Todd	LC	INS	0.033		14.3
2515-2	Tripp County Water User District	Tripp	LC	RWS	2.68	1,200	1,200
2621-2	Tuthill Community Presbyterian Church	Bennett	LC	INS	0.02		8.7
2804-2	Dougherty Cattle Company Inc	Tripp	PE	COM	0.13	16.12	16.12
2849-2	Tripp County Water User District	Tripp	FU	RWS			4,400
LC: Licensed Water Right; PE: Water Permit; FU: Future Use Reservation; COM: Commercial						TOTAL:	12,275
DOM: Domestic; FWP: Fish and Wildlife Propagation; INS: Institutional; MUN: Municipal; RWS: Rural Water System							

Currently, there are 142 irrigation water rights/permits authorized to appropriate water from the Ogallala aquifer, with 136 (including Right No. 1260-2) irrigation water rights/permits authorized to appropriate water from the main body of the Ogallala aquifer (Water Rights, 2022c). Irrigation water rights/permits have been typically required to report their annual usage on an irrigation questionnaire since 1979. The estimated average annual withdrawal rate for the irrigation water rights/permits within the main body of the Ogallala aquifer that have reported over the period of record is approximately 19,212 acre-feet per year (Table 3) (Water Rights, 2022a). To reflect the current development of irrigation water rights/permits more accurately, the average annual withdrawal rate for irrigation appropriations from 2012 to 2021 that have reported over the period of record is approximately 23,726 acre-feet per year (Table 3) (Water Rights, 2022a).

Table 3 only lists 131 water rights/permits as reporting in 2021 as Water Permit Nos. 2822-2, 2833-2, 2834-2, 2836-2 and 2847-2 were approved in 2021 or 2022, and collectively authorize the irrigation of 735 acres, and have not submitted an irrigation questionnaire at this time (Water Rights, 2022a and 2022c). The five water permits approved in 2021 or 2022 for irrigation use, account for the difference between the 136 water rights/permits currently active out of the 131 permits listed as reporting in 2021 on Table 3 (Water Rights, 2022a and 2022c). Generally, irrigators in South Dakota apply less than one foot of water per acre per year. However, to account for the fluctuation in wet and dry cycles from year to year, the one foot of water per acre per year application rate will be used to somewhat overestimate the annual withdrawal rate for these irrigation water permits. Therefore, the estimated average annual withdrawal rate for the

irrigation water permits approved in 2021 or 2022 (and not included as listed as reporting on Table 3) is approximately 735 acre-feet per year (Water Rights, 2022c). The collective estimated average annual withdrawal rate for the irrigation appropriations from 2012 to 2021 (23,726 acre-feet/year), plus the estimated average annual withdrawal rate for the irrigation water rights/permits approved in 2021 or 2022 (735 acre-feet/year), is approximately 24,461 acre-feet/year (Water Rights, 2022a and 2022c).

There are domestic wells completed into the Ogallala aquifer that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2022d). Due to their relatively low diversion rates, withdrawals from domestic wells are not considered to be a significant portion of the hydrologic budget. Therefore, the quantity of water withdrawn by domestic wells is estimated to be negligible to the hydrologic budget for the Ogallala aquifer.

Data was compiled for selected irrigation and municipal wells operated by the Rosebud Sioux Tribe (Valseth and Driscoll, 2020). However, it is likely not all municipal and irrigation wells that are operated by the tribe or on tribal lands were included. Furthermore, many of the selected wells that were reviewed do not include well depth or aquifer assignment to determine if the wells are completed into the Ogallala aquifer. The data does not include an estimated annual volume pumped by each well. The data available is only estimated mean production (pumping rate). Therefore, there is not sufficient information available to make a reasonably accurate estimate of average annual water use from these wells. Overall, the withdrawal rate from the Ogallala aquifer by tribe members on tribal trust land is not known.

Hydrologic Budget Summary

The estimated average annual recharge rate to the main body of the Ogallala aquifer in South Dakota ranges between approximately 108,914 to 284,852 acre-feet per year. The estimated average annual withdrawal rate from the main body of the Ogallala aquifer is approximately 37,010 acre-feet per year (including the estimated use for Water Permit Application Nos. 2851-2 and 2852-2, if approved) (Water Rights, 2022c). The average annual withdrawal rate was totaled from the non-irrigation water rights/permits (including future use): 12,275 acre-feet/year; irrigation (average from 2012 to 2021 plus Nos. 2822-2, 2833-2, 2834-2, 2836-2, and 2847-2): 24,461 acre-feet/year; Water Permit Application Nos. 2851-2 and 2852-2 (if approved, assuming one foot application rate per authorized acre): 270 acre-feet/year).

Additionally, an unknown amount of water may be withdrawn from the Ogallala aquifer by tribe members on tribal trust land. The estimated average annual withdrawal rate based on the water rights/permits currently authorized to appropriate water from the Ogallala aquifer is less than 30% of the lowest estimated average annual recharge rate to the aquifer.

Based on the hydrologic budget, there is a reasonable probability unappropriated water is available from the main body of the Ogallala aquifer for the proposed appropriation.

Table 3. Reported historic irrigation use from the main body of the Ogallala aquifer (Water Rights, 2022a)

Year	No. of Permits Reporting	Reported Pumpage (acre-feet)
1982	91	9,217.4
1983	98	10,172
1984	106	13,298.4
1985	104	18,583.5
1986	100	12,997.6
1987	99	12,397
1988	98	16,199.3
1989	99	27,326.4
1990	103	16,501.6
1991	104	16,074.5
1992	104	11,921
1993	102	11,151.9
1994	105	16,705.3
1995	103	14,252.8
1996	106	21,168
1997	107	18,661
1998	105	13,857.9
1999	106	13,709.5
2000	107	16,119
2001	106	17,989.9
2002	101	24,179.8
2003	103	22,039.1
2004	105	23,868
2005	106	20,054.7
2006	109	25,657.1
2007	111	24,010.9
2008	112	24,483.6
2009	112	22,173.6
2010	111	21,209.1
2011	112	15,235.4
2012	114	33,144.5
2013	124	26,492.3
2014	131	22,126.7
2015	131	23,993.9
2016	134	23,297.6
2017	135	27,319.3
2018	132	19,384.3
2019	131	11,464.1
2020	131	22,058.8
2021	131	27,976.4
Min	91	9,217
Max	135	33,145
Avg	111	19,212
Avg 2012-2021	129	23,726

OBSERVATION WELL DATA:

Administrative Rule of South Dakota (ARSD) 74:02:05:07 requires that the Water Management Board shall rely upon the record of observation well measurements in addition to other data to determine that the quantity of water withdrawn annually from the aquifer does not exceed the estimated average annual recharge of the aquifer.

Observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. The DNR-Water Rights Program monitors 76 observation wells completed into the Ogallala aquifer, with 69 observation wells being completed into the main body of the Ogallala aquifer (Water Rights, 2022b). The five closest observation wells to the proposed diversion points are TD-76F (approximately 2.2 miles northwest), TD-90A (approximately 2.8 miles northwest), TD-#08 (approximately 4.6 miles southwest), TD-76C (approximately 4.8 miles northwest), and TD-76G (approximately 4.9 miles northeast) (Water Rights, 2022b). The hydrographs for these observation wells are displayed in Figures 1 to 5 (Water Rights, 2022b). The data points utilized to construct the hydrographs are measurements of the static water level in the observation wells from the top of the well casing. It is worth noting the hydrograph titles display DENR Water Rights Observation Well on the hydrographs when the titles should display DNR Water Rights Observation Well on the hydrographs.



Figure 1. Hydrograph for observation well TD-76F (Water Rights, 2022b)



Figure 2. Hydrograph for observation well TD-90A (Water Rights, 2022b)

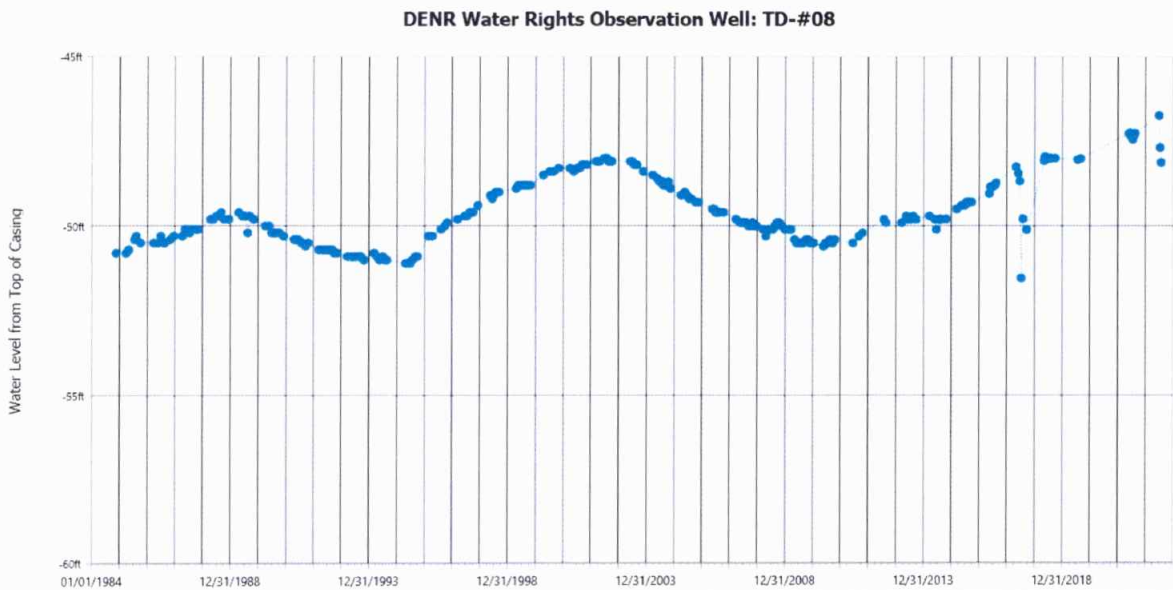


Figure 3. Hydrograph for observation well TD-#08 (Water Rights, 2022b)

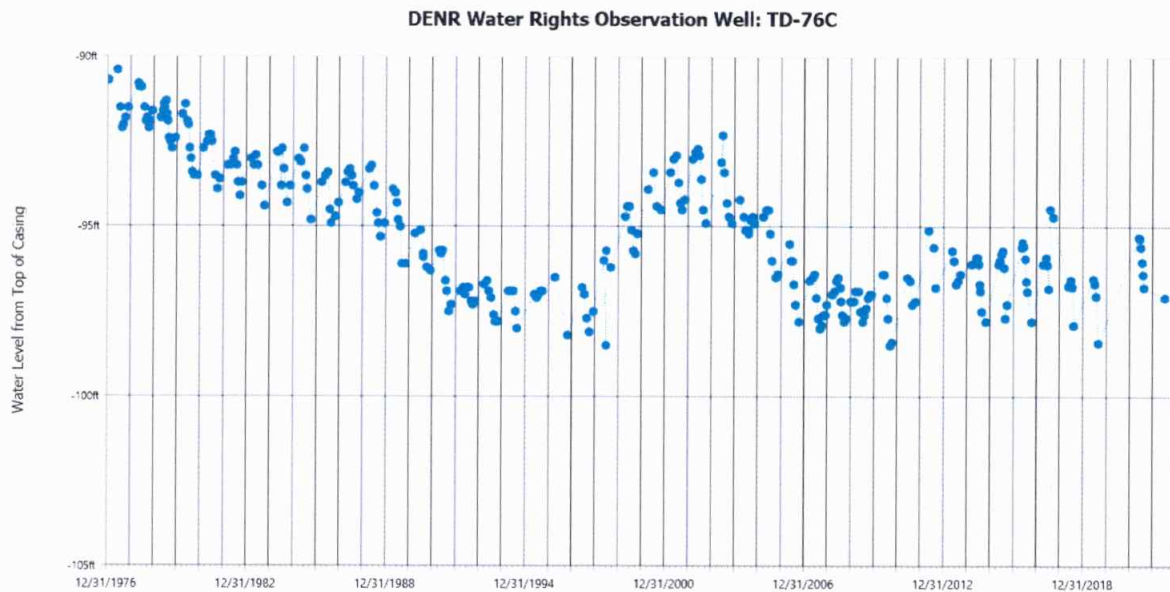


Figure 4. Hydrograph for observation well TD-76C (Water Rights, 2022b)

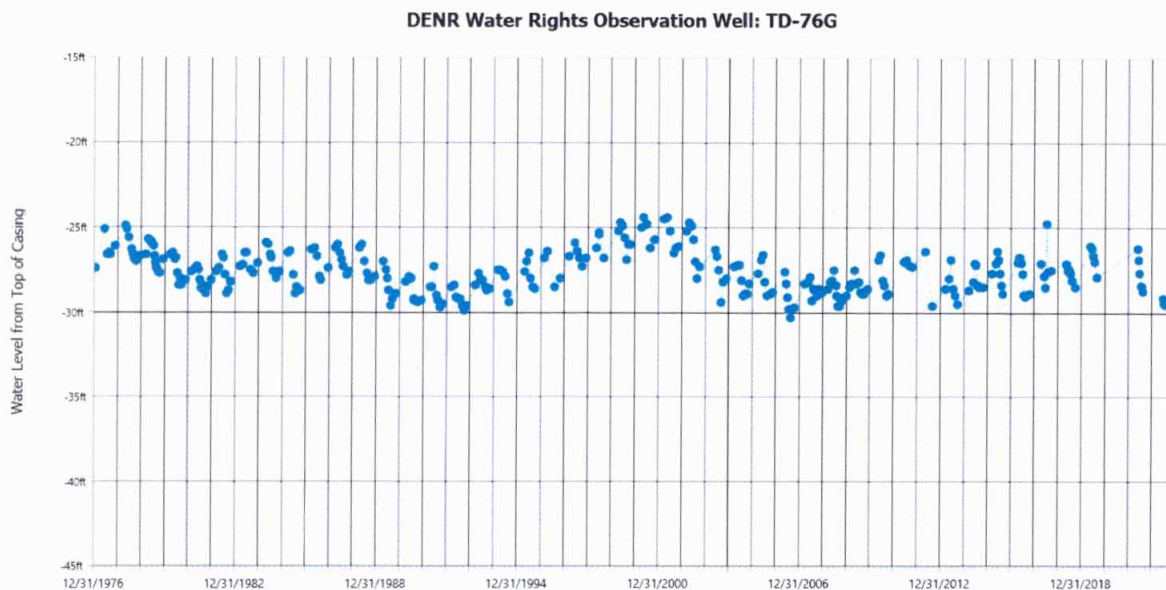


Figure 5. Hydrograph for observation well TD-76G (Water Rights, 2022b)

The hydrographs for the observation wells completed into the main body of the Ogallala aquifer display stable to slightly increasing water levels over their respective periods of record, except in areas of significant recent development such as Bennett County and portions of Todd County (Water Rights, 2022b). In the areas of significant recent development, some hydrographs show a slight recent decline in water levels (Water Rights, 2022b). This is likely representative of the potentiometric surface of the aquifer equilibrating to new and increased pumping and not indicative of over appropriation.

The hydrographs for observation wells completed into the main body of the Ogallala aquifer indicate that the aquifer responds well to climatic conditions because water levels are rising during wetter periods and declining to a stable water level during drier periods. Additionally, the water levels in the observation wells display that the amount of recharge to and natural discharge from the aquifer greatly exceeds pumping with the aquifer returning to pre-pumping conditions between irrigation seasons. Aquifer recovery indicates that climatic conditions and therefore, the effects of recharge to and natural discharges from the aquifer govern the long-term fluctuations of water levels in the aquifer rather than the impacts of pumping from the main body of the Ogallala aquifer. By recognizing that both recharge to and natural discharge from an aquifer can be captured for pumping, the observation well hydrographs demonstrate unappropriated water is available for the proposed appropriation.

POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:

Currently, there are 172 water rights/permits that are authorized to withdraw water from the entirety of the Ogallala aquifer and five future use permits reserving water (Water Rights, 2022c). Within the main body of the Ogallala aquifer, there are currently 150 water rights/permits authorized to withdraw water, and three future use permits reserving water (Water Rights, 2022c). The closest water right/permit to the proposed diversion points is Water Right No. 1543A-2, which is held by Danielski Harvesting & Farming. The diversion point for Water Right No. 1543A-2 is located approximately 0.4 miles northwest of the proposed diversion points for these applications (Water Rights, 2022c).

There are domestic wells on file with the DANR-Water Rights Program that are completed into the Ogallala aquifer, with the closest domestic well on file (not held by the applicant) approximately 0.4 miles east of the proposed diversion points (Water Rights, 2022d). There could potentially be other domestic wells completed into the Ogallala aquifer near the proposed diversion points that are not on file with the DANR-Water Rights Program.

The Ogallala aquifer is generally unconfined but can be locally confined (Filipovic, 2004 and 2011; Water Rights, 2022d). The Ogallala aquifer is expected to be unconfined in the area of the proposed diversion points based on the water well completion reports on file, and the lithologic logs on file for nearby observation wells (SDGS, 2022; Water Rights, 2022b, 2022c and 2022d). Drawdown created by pumping a well generally does not extend far from the pumped well in an unconfined aquifer; however, in a confined aquifer, drawdown from pumping could extend a distance from the diversion point. The exact drawdown behavior of a well cannot be known without an aquifer performance test. Examination of the hydrographs for observation wells completed into the Ogallala aquifer show no signs of being significantly impacted by drawdown caused by pumping, despite usually being located within a mile of several high-yield wells (assumed to be a well with an authorized diversion rate greater than 0.2 cfs) (Water Rights, 2022b and 2022c).

Near the proposed diversion points, the Ogallala aquifer has a saturated aquifer thickness ranging from approximately 40 to 140 feet (Water Rights, 2022c and 2022d). This would generally allow for enough thickness for a pump inlet to be placed 20 feet below the top of the aquifer, which is

required for the well to be considered adequate. An adequate well is defined by ARSD 74:02:04:20(6) as “a well constructed or rehabilitated to allow various withdrawal methods to be used, to allow the inlet to the pump to be placed not less than 20 feet into the saturated aquifer or formation material when the well is constructed, or to allow the pump to be placed as near to the bottom of the aquifer as is practical if the aquifer thickness is less than 20 feet.” Any drawdown as a result of the proposed diversion is not expected to unlawfully impair nearby adequate wells. In Todd County, there have been no substantiated complaints submitted to the DANR-Water Rights Program regarding well interference for adequate wells completed into the Ogallala aquifer (Water Rights, 2022d).

When considering the generally unconfined nature of the aquifer, the saturated thickness of the Ogallala aquifer near the proposed diversion points, and the lack of well interference complaints from the Ogallala aquifer in the area, any drawdown created from the proposed diversion is not expected to cause an unlawful impairment on existing water right/permit holders or domestic users with adequate wells. Therefore, there is a reasonable probability that any interference from the proposed diversions by Water Permit Application Nos. 2851-2 and 2852-2 will not impose unlawful impairments on existing users with adequate wells.

CONCLUSIONS:

1. Water Permit Application No. 2851-2 proposes to divert water at a maximum instantaneous rate of 1.78 cfs from two wells to be completed into the Ogallala aquifer (approximately 240 feet deep) for the irrigation of 135 acres. The site of interest is located in Todd County approximately 16 miles south of Mission, SD.
2. Water Permit Application No. 2852-2 proposes to divert water at a maximum instantaneous rate of 1.78 cfs from two wells to be completed into the Ogallala aquifer (approximately 240 feet deep) for the irrigation of 135 acres. The site of interest is located in Todd County approximately 17 miles south of Mission, SD.
3. Based on observation well data and the hydrologic budget, there is a reasonable probability that unappropriated water is available from the main body of the Ogallala aquifer to supply the proposed appropriations.
4. There is a reasonable probability that the proposed diversions by Water Permit Application Nos. 2851-2 and 2852-2 will not unlawfully impair adequate wells for existing water rights/permits and domestic users.



Nakaila Steen
Natural Resources Engineer II
SD DANR - Water Rights Program

Reviewed by:



Adam Mathiowetz, PE
Natural Resources Engineer IV
SD DANR -Water Rights Program

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